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Kokai (unexamined patent publication) Utility Model Showa 56 (AD1981)-85012

- Revenue stamps -

(4000 yen) Application for Utility Model Registration

December 5, Showa 54 (AD1979)

TO: Tadao Kawahara, Commissioner of the Patent Office

1. Name of Model

Support sheet for Catalyst substrate of Automotive emission gas purifier

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5. List of Attachments

(1) Power of Attorney: 1

(2) Specification: 1

(3) Drawing 1

54 168541 (*Stamped*)

85012 (*Written by hand*)

Showa 56-85012 (1981)

Laid Open Utility

New Utility Design Registration Application

Showa 54-12/05 (1979), December 5th

Patent Office Chief

1. Name of the Design

**Protective Sheet Used in Catalyst Support Material of Automobile Exhaust
Gas Purification Device**

2. Design author:

Address: Iokohama city, Kanazawa-ku, Tomioka machi 800-61

Name: Aoki Susumu (two more authors)

3. Design Applicant: Nippon Asbestos Company

4. Representatives

5. Records of the attached documents

(1) Power of attorney	1 copy
(2) Detailed description of the invention	1 copy
(3) Figures	1 copy

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Detailed Description

1. Name of the Invention

Protective Sheet Used in Catalyst Support Material of Automobile Exhaust Gas Purification Device

2. Scope of the novel claims used in practice

- (1) Protective sheet used in catalyst support material of automobile exhaust gas purification device characterized by the fact that on both sides of a sheet type core material made at the predetermined thickness and by using vermiculite as its main material, sheet type cover material selected from the group of glass cloth, ceramic fiber cloth, glass paper, ceramic fiber paper, aluminum foil is stacked and combined, and both materials are bonded and unified as one body.
- (2) Protective sheet used in catalyst support material of automobile exhaust gas purification device according to the above described Claim paragraph 1 of the present invention, characterized by the fact that the above described sheet shaped core material and sheet shaped cover material, are bonded by a thread through a machine.
- (3) Protective sheet used in catalyst support material of automobile exhaust gas purification device according to the above described Claim paragraph 1 of the present invention, characterized by the fact that the above described sheet shaped core material and sheet shaped cover material, are bonded by an adhesive agent.

3. Detailed Explanation of the Invention

This invention is an invention about a protective sheet used in catalyst support material of automobile exhaust gas purification device, and especially, this is an invention about the improvement of the protective sheet which uses vermiculite as its main material.

In the past, as automobile exhaust gas purification devices the purification devices have been widely used where the catalyst used for the purification has been supported in a honeycomb structure material manufactured from ceramics, and this honeycomb structure material has been housed in a box shaped container made from metal.

The above described ceramic material that can be used to support the catalyst is a material that has excellent thermal resistance properties, which are sufficient at the high temperatures that are generated during the action of the catalyst, and because of that it is a material that is optimum as a catalyst supporting material. However, on the other hand, there has been the difficulty point that this ceramic material is very brittle and it is easily deteriorated by thermal impacts and mechanical impacts.

Because of that, in the case of the above described purification device, in the space between the manufactured from ceramic honeycomb structure body and the manufactured from metal box shaped container, housing it, a material is filled that is capable of absorbing mechanical and thermal impacts.

As the above described filler material, inorganic materials are appropriate, and among them, especially, the sheet material containing vermiculite as its main component, is most appropriate as a filler material for the above described purification device because it has excellent thermal resistance properties, and not only that, but also, because of the fact that it tightly fills in the space between the metal box shaped container, which expands when heated, and the honeycomb structure material, and demonstrates excellent cushioning properties relative to vibrations and impacts.

However, in the case of the above described sheet that is formed from vermiculite, a material is used that is obtained as inorganic fiber material and organic bonding agent are added to the vermiculite together with water, and this is then stirred and mixed, and the obtained mixed material is subjected to a spread out preparation treatment and by that it is formed into a sheet shaped material.

However, in the case of the vermiculite sheet material that is obtained according to this process, there is a problem point with respect to the mechanical strength, and especially, the tensile strength is poor, and because of that in the manufacturing operation where this is wrapped onto the honeycomb structure material, there is a generation of numerous breaks and cuts, and the break damage proportion is high and this has been the main deficiency.

The present invention is an invention that has been conceived in order to solve the above described problems, and it is an invention that has as its main goal to suggest a protective sheet used in catalyst support materials where it is possible to design a significant increase of the tensile strength of the sheet without compromising the properties of the vermiculite sheet material, and not only that, but also, it is possible to design an increase in the thermal resistance properties and thermal insulation properties of the sheet.

The protective sheet used in catalyst support material according to the present invention is characterized by the fact that it has a structure where on both sides of a sheet type core material made at the predetermined thickness and by using vermiculite as its main material, sheet type cover material selected from the group of glass cloth, ceramic fiber cloth, glass paper, ceramic fiber paper, aluminum foil is stacked and combined, and both materials are bonded and unified as one body.

Here below, this invention will be explained in further details based on diagrams that show its different practical implementation examples.

According to Figure 1 through Figure 5, (1) represents the sheet shaped core material that is formed by using vermiculite as its main component, and (2) represents the sheet shaped cover material that is placed and bonded on its both sides.

Regarding the sheet shaped core material (1) that has vermiculite as its main component, it is a good option if it is obtained as inorganic fiber material and organic bonding agent are added to the vermiculite together with water, and this is then stirred and mixed, and the obtained mixed material is subjected to a spread out preparation treatment and by that it is formed into a sheet shaped material. As the vermiculite that is used as the main component, it is a good option if untreated raw material particles are used, however, depending on the requirements, it is also possible to use particles that have been coated and pretreated so that they can easily spread at low temperatures and materials where covered treated particles have been admixed.

As the sheet shaped cover material (2) that has been shown according to the presented in Figure 1 and Figure 2, it is possible to use nonwoven fabric material like glass cloth, ceramic fiber cloth etc., and this is then bonded and unified as one body with the above described sheet shaped core material (1) by a thread (3) using a machine.

In the case of the sheet shaped cover material (2) that is shown in Figure 3, its structure is formed as an inorganic paper (2a), such as glass paper or ceramic fiber paper and the surface of the core material (1) are brought together, and by using a machine they are bonded and unified as one body by using a thread.

In the case of the sheet shaped cover material (2) that is shown in Figure 4, a material is selected from the group of glass cloth, ceramic fiber cloth, glass fiber, ceramic fiber paper, aluminum foil, and by using the adhesive agent (4), this is bonded to the core material (1) and unified as one body.

The material shown according to Figure 5 is a material where on one side of a core material (1), which has been made into a fine length sheet shape, the ceramic fiber paper (2a) is adhered, and the surface of the opposite side and both side surfaces are wrapped by using a cover material (2) made from glass cloth, and these edge parts are adhered on the top of the paper (2a).

Regarding the means for bonding of the sheet shaped cover material (2) to the vermiculite sheet shaped core material (1), in the case when

the cover material (2) is a material such as a nonwoven fabric, it is advantageous if it is bonded by using a machine and employing the thread (3), however, in the case when thin materials such as paper or aluminum foil, are used, it is appropriate if it is bonded by using an adhesive agent.

According to the above described, the material obtained is a protective sheet material where on both surfaces of a vermiculite sheet shaped core material (1), the sheet shaped cover material (2) has been bonded as one unified body, and it is a material where there is no hindrance to the expansion properties possessed by the sheet shaped core material, and an increase of the mechanical strength has been designed.

- Especially, in the case of the above described structure, a sufficient tensile strength is obtained, and because of that it is possible to practically eliminate the danger of breaks – cuts which occur at the time of the wrapping onto the honeycomb structure material, which is the catalyst supporting material, and at the time of the placement into the metal box shaped container.

Also, in the case of the above described structure, it is possible to also eliminate the stress relaxation of the vermiculite sheet shaped core material (1) at high temperatures (700°C ~ 1000°C), and together with that by the presence of the sheet shaped cover material (2) that is formed from inorganic material, the thermal insulation properties and the thermal resistance properties of the protective sheet are further increased, and because of that there is a pronounced effect of preventing the deterioration of the vermiculite material.

Then, also, in the case of the above described structure, the vermiculite sheet shaped core material (1) is squeezed from both sides by the bonded to it sheet shaped cover material (2), and because of that, an excellent effect is demonstrated in suppressing the phenomenon of generation of vermiculite powder “sagging” due to the effect of vibrations and impacts for a long duration at the time when the automobile is running.

According to the above described, in the case of the present invention, it is possible that in the state where the expansion properties of the vermiculite are maintained in the state as they are, the mechanical strength is significantly increased, and because of that it is possible to

design a an improvement of the handling properties of the vermiculite sheet, and together with that it is possible to eliminate the breaks – cuts which occur at the time of the wrapping onto the honeycomb structure material, which is the catalyst supporting material, and at the time of the placement into the metal box shaped container; and not only that, but also, there is an excellent effect in suppressing the phenomenon of generation of vermiculite powder “sagging” due to the effect of vibrations and impacts and a large improvement in the durability properties of the automobile exhaust gas purification device, is imparted.

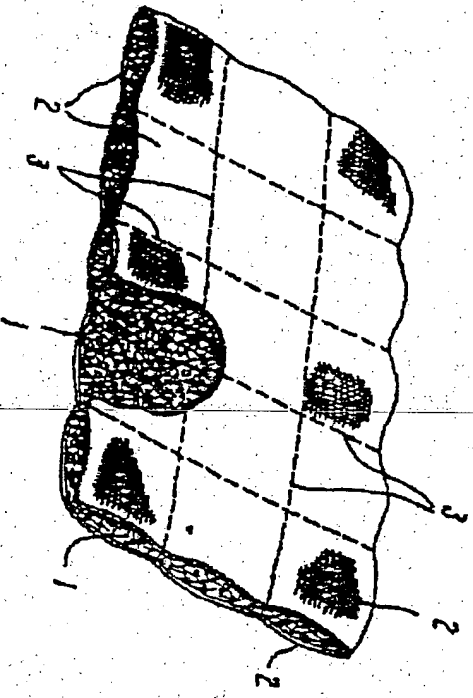
4. Brief Explanation of the Figures

Figure 1 shows one practical implementation example according to the present invention and it represents a three-dimensional diagram where one part of the protective sheet used for the catalyst support in the automobile exhaust gas purification device, has been cut out. Figure 2 represents a partial enlarged cross sectional view diagram, Figure 3 shows another practical example according to the present invention and it is a cross sectional view diagram of the protective sheet part. Figure 4 shows another practical example according to the present invention and it is a cross sectional view diagram of the protective sheet part. Figure 5 shows another practical example according to the present invention and it is a cross sectional view diagram of the protective sheet part. Figure 6 shows another practical example according to the present invention and it is a cross sectional view diagram of the protective sheet part.

- (1).....vermiculite sheet shaped core material
- (2)sheet shaped cover material
- (3) thread
- (4)adhesive agent

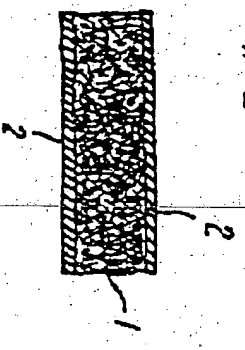
Patent Assignee: Nippon Asbestos Company

第1圖

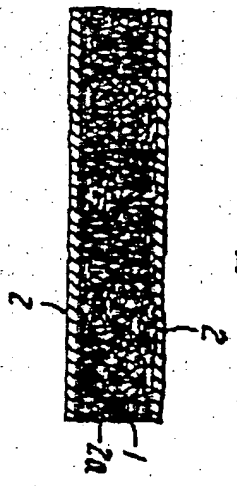


第1圖

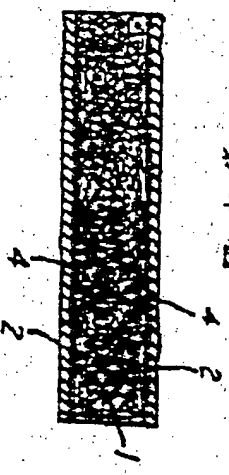
第2圖



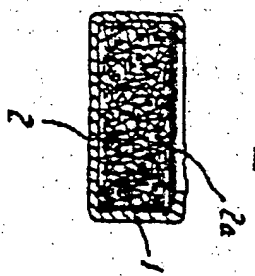
第3圖



第4圖



第5圖



85012

第1圖



(4,000円) 実用新案登録願

昭和54年12月5日

特許庁長官 川 原 能 雄 殿

1. 考案の名称

自動車排気ガス浄化器の触媒担持体用保護シート
シドウシヤハイキ ショウカキ ショクタンパイタンシタイヨウホゴ

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5. 添附書類の目録

- | | |
|-----------|-----|
| (1) 委 任 状 | 1 通 |
| (2) 明 細 書 | 1 通 |
| (3) 図 面 | 1 通 |

明 細 書

1 考案の名称

自動車排気ガス浄化器の触媒担持体用保護シート

2 実用新案登録請求の範囲

- (1) パーミキュライトを主材として所要の厚さにつくられたシート状芯材の両面に、ガラスクロス、セラミックファイバークロス、ガラスペーパー、セラミックファイバーパー、アルミ箔から選定されたシート状被覆材が重ね合わされ、両者が一体に結合されていることを特徴とする自動車排気ガス浄化器の触媒担持体用保護シート。
- (2) 前記シート状芯材とシート状被覆材とは、ミシンがけによる縫糸で結合されていることを特徴とする実用新案登録請求の範囲第1項記載の自動車排気ガス浄化器の触媒担持体用保護シート。
- (3) 前記シート状芯材とシート状被覆材とは、接着剤によつて結合されていることを特徴とする実用新案登録請求の範囲第1項記載の自動車

排気ガス浄化器の触媒担持体用保護シート。

3. 考案の詳細な説明

この考案は、自動車排気ガス浄化器に用いられる触媒担持体の保護シートに係るもので、とくにパーミキュライトを主材とした保護シートの改良に関するものである。

従来、自動車の排気ガス浄化器として、セラミック製のハニカム構造体に浄化用触媒が担持され、そのハニカム構造体が金属製筒形容器内に収められ浄化器が多く使われている。

触媒の担持に用いられる前記セラミック材は、触媒作用中に発生する高温に十分に耐える優れた耐熱性を具備していることから、触媒担持体として最適なものとされているが、その反面、このセラミック体は強度的に脆く、熱衝撃および機械的衝撃に対して劣化し易いことが難点とされている。

それがため前記浄化器においては、セラミック製ハニカム構造体と、これを保持する金属製筒形容器とのあいだに、機械的衝撃と熱衝撃を

吸収できる材料が充填されている。

上記充填材料としては、無機材料が適当で、なかんずく、パーミキュライトを主材としたシート材は、優れた耐熱性があり、しかも加熱されると膨張して金属筒形容器とハニカム構造体とのあいだの空隙にピッタリと充填され、振動や衝撃に対して優れたクッション性が発揮されるので、前記浄化器の充填材に最も適している。

しかして前記パーミキュライトから成るシート材は、パーミキュライトに無機繊維および有機結合材を水と共に加えて混合攪拌して得られた混合物を抄造処理によつてシート状に形成したものが使われているが、このようにして形成されたパーミキュライトのシート材は機械的強度に難点があり、とくに引張り強度に劣るので、ハニカム構造体への巻着作業において、破損・切断の発生が多くみられ、破損率の高いことが最大の欠点とされている。

この考案は、上記の問題を解決するためになされたものであつて、パーミキュライトシート

の特性をかえることなく、シートの引張り強度の大巾な増大が図れ、しかもシートの耐熱性および断熱性の向上も図れる触媒担持体用保護シートを提供することを主たる目的としているものである。

この考案による触媒担持体用保護シートは、パーミキュライトを主材として所要の厚さにつくられたシート状芯材の両面に、ガラスクロス、セラミックファイバークロス、ガラスペーパー、セラミックファイバーパー、アルミ箔から選定されたシート状被覆材が重ね合わされ、両者が一体に結合されている構成に特徴を有するものである。

以下、この考案を、その各種実施例を示した図面に基いて詳しく説明する。

第1図ないし第5図において(1)はパーミキュライトを主材として形成されたシート状芯材、(2)はその両面に重ね合わされたシート状被覆材である。

パーミキュライトを主材とするシート状芯材

(1)は、パーミキュライトに無機繊維および有機結合材を水と共に加えて攪拌混合して得られた混合物を抄造処理でシート状にしたものがよい。主材となるパーミキュライトは、未処理の原料粒子が使われるが、必要に応じては、低温で容易に膨張できるようにした膨張予備処理粒子および膨張させた粒子を混合したものを用いることができる。

第1図および第2図に示したシート状被覆材(2)は、ガラスクロス、セラミックファイバークロスのような無機繊維布が用いられ、前記シート状芯材(1)にミシシがけによる縫糸(3)で一体に結合されている。

第3図に示したシート状被覆材(2)は、芯材(1)の片面では、その面に積層されたガラスペーパーまたはセラミックファイバーパーペーパーのような無機質ペーパー(2a)と共に構成され、ミシシがけによる縫糸(3)で一体に結合されている。

第4図に示したシート状被覆材(2)は、ガラスクロス、セラミックファイバークロス、ガラス

ペーパー、セラミックファイバーペーパー、アルミ箔から選定したものが用いられ、接着剤(4)で芯材(1)に一体に結合されている。

第5図に示したものは、細長いシート状につくられた芯材(1)の片面にセラミックファイバーペーパー(2a)が接着され、反対側の面と両側面とがガラスクロスからなる被覆材(2)で包みこまれ、その端部がペーパー(2a)のうえで接着されている。

バーミキュライトのシート状芯材(1)に対するシート状被覆材(2)の結合手段は、被覆材(2)が繊維布のようなものである場合には、ミシンがけによる縫糸(3)で結合するのが有利であるが、ペーパーやアルミ箔のような薄いものである場合には、接着剤による結合が適している。

上記のように、バーミキュライトのシート状芯材(1)の両面にシート状被覆材(2)が一体に結合された保護シートにあつては、シート状芯材(1)のもつ膨張特性を阻害させることなく、機械的強度の増大が図れる。とくに前記の構成によれ

ば、十分な引張り強度が得られるので、触媒担持体であるハニカム構造体への巻着時ならびに金属製筒形容器への嵌挿時における破損・切断のおそれを確実に防止することができる。

「また上記構成によれば、パーミキュライトのシート状芯材(1)の高温(700℃~1000℃)での応力緩和も防止できると共に、無機質材料からなるシート状被覆材(2)の存在により、保護シートの断熱性および耐熱性が一段と高められるので、パーミキュライトの劣化防止に顕著な効果がある。」

さらにまた上記構成によれば、パーミキュライトのシート状芯材(1)は、それに結合されたシート状被覆材(2)によつて両面から挟持されているので、自動車走行時の振動・衝撃を長期間受けることによるパーミキュライトの粉化「へたり」現象発生抑制にもすぐれた効果が発揮される。

以上に述べたように、この考案によれば、パーミキュライトシートの膨張特性がそのまま保

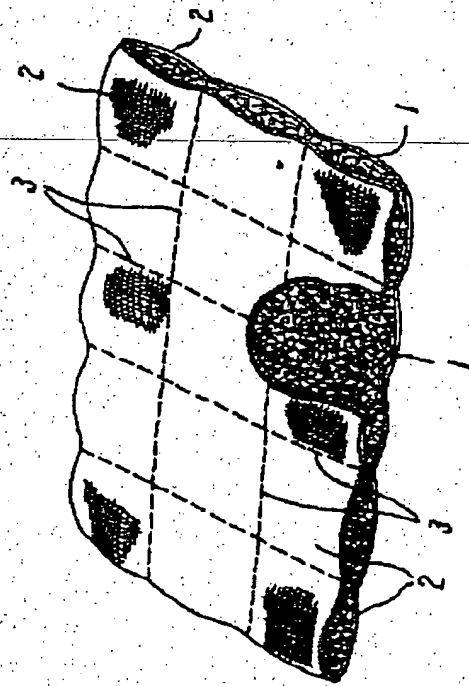
持された状態で機械的強度の大巾な強化ができるので、パーミキュライトシートのハンドリング性の向上が図れると共にシートを触媒担持体に巻きつけて金属製筒形容器内に挿入する装着作業時での破損・切断を皆無とすることができ、しかも振動・衝撃によるパーミキュライトの粉化「へたり」現象の抑制にすぐれた効果があり、自動車排気ガス浄化器の耐久性向上に大きく寄与することができる。

4. 図面の簡単な説明

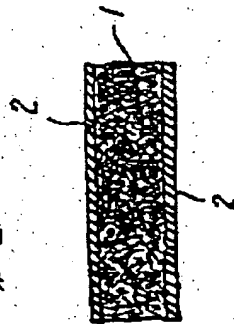
第1図はこの考案の一実施例を示す自動車排気ガス浄化器の触媒担持体用保護シートの一部切断斜視図、第2図は一部の拡大断面図、第3図は他の実施例を示す保護シートの部分断面図、第4図は他の実施例を示す保護シートの部分断面図、第5図は他の実施例を示す保護シートの部分断面図である。

(1) … パーミキュライトのシート状芯材、(2) … シート状被覆材、(3) … 縫糸、(4) … 接着剤。

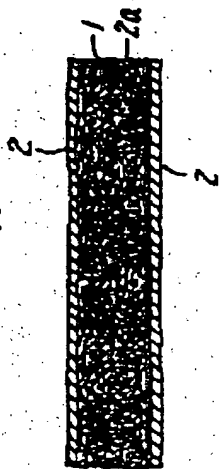
第1図



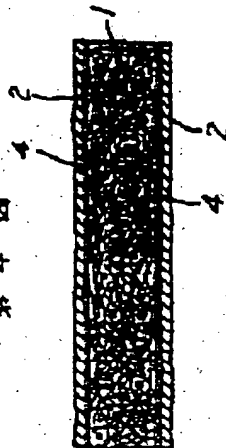
第2図



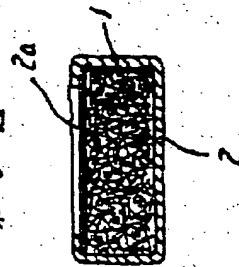
第3図



第4図



第5図



85012

6. 前記以外の考案者

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